

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 30

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte BRUCE E. DOLMOVICH

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Appeal No. 1997-0281  
Application No. 08/351,874<sup>1</sup>

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HEARD: January 13, 2000

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Before KRASS, BARRETT, and BARRY, Administrative Patent Judges.  
BARRY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the final rejection of claims 1, 5-8, and 9-14. We reverse.

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<sup>1</sup> The application was filed on December 8, 1994. It is a continuation of Application Serial No. 07/943,928, which was filed on September 11, 1992 and is now abandoned.

Appeal No. 1997-0281

Application No. 08/351,874

BACKGROUND

The invention at issue is an ignition system that provides high energy ignition sparks at consistent voltage levels. Ignition systems for igniting fuel in turbine engines have been used widely since the 1950s. Historically, a gas-filled device containing a spark gap has functioned as a switch in these ignition systems. Such devices, however, deteriorated with time and repeated sparking events. Recently, solid-state switches have been substituted for gas-filled spark gap devices. Although such switches are more reliable over time than gas-filled spark gap devices, the solid-state switches require external control circuitry, which increases the parts count needed to implement an ignition system. The invention provides a solid-state switch for a gas turbine ignition system that possesses the reliability of recent solid-state switches and reduces the parts count needed to start an ignition system.

Claim 13, which is representative for our purposes, follows:

13. A capacitive discharge ignition system responsive to a power source for igniting fuel to power a turbine engine, the system comprising: a capacitive energy storage device; power conditioning circuitry responsive to the power source for pumping approximately two joules or more of energy into the capacitive energy storage device; an igniter plug for igniting the fuel; output circuitry for delivering the energy from the energy storage device to the plug; a passive network having only two terminals which connect the network to the capacitive energy storage device and the output circuitry for completing a path discharging the capacitive energy storage device into the igniter plug; the passive network comprising (1) a solid-state switch for alternately providing high and low impedance paths between the two terminals, thereby selectively discharging the capacitive energy storage device into the output circuitry and the igniter plug, and (2) a breakover diode responsive to a predetermined value of a voltage differential (V) between the two terminals for effecting the switching of the path between the two terminals provided by the solid-state switch from a high impedance value to a low impedance value, thereby controllably discharging the capacitive energy storage device into a spark gap of the igniter plug by way of the output circuitry.

Besides the appellant's admitted prior art (AAPA), the references relied on in rejecting the claims follow:

Roberts	3,349,284	Oct. 24, 1967
Hirosawa et al. (Hirosawa)	3,367,314	Feb. 6, 1968
Wolf et al. (Wolf)	4,449,497	May 22, 1984.

Claims 1, 4, and 14 stand rejected under 35 U.S.C. § 103 as obvious over AAPA in view of Hirosawa. Claims 5 and 10 stand rejected under § 103 as obvious over AAPA in view of Hirosawa further in view of Roberts. Claims 6-8 stand rejected under § 103 as obvious over AAPA in view of Hirosawa further in view of Wolf. Claims 11-13 stand rejected under § 103 as obvious over Hirosawa. Rather than repeat the arguments of the appellant or examiner in toto, we refer the reader to the brief and answer for the respective details thereof.

#### OPINION

In reaching our decision in this appeal, we considered the subject matter on appeal and the rejections advanced by the examiner. Furthermore, we duly considered the arguments and evidence of the appellant and examiner. After considering the totality of the record, we are persuaded that the examiner erred in rejecting claims 1, 5-8, and 9-14. Accordingly, we reverse.

We begin by noting the following principles from In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993).

In rejecting claims under 35 U.S.C. Section 103, the examiner bears the initial burden of presenting a prima facie case of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Only if that burden is met, does the burden of coming forward with evidence or argument shift to the applicant. Id. "A prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." In re Bell, 991 F.2d 781, 782, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting In re Rinehart, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)). If the examiner fails to establish a prima facie case, the rejection is improper and will be overturned. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

With these in mind, we analyze the appellant's argument.

The appellant argues, "Breakover diodes and Zener diodes are distinct devices with completely different architectures and operating different architectures and operating characteristics. As such, breakover diodes and Zener diodes cannot be used interchangeably and are, in fact, suited for completely different applications." (Dolmovich Decl., ¶ 3.)

He adds, "the rejections ... are improperly based on a

hindsight reconstruction of the invention; ... no suggestion for making the combination recited in the Office action appears in the art of record ...." (Appeal Br. at 17.) The examiner replies, "the fact is that they are art recognized equivalent which is not the same as pure functional equivalence as Mr. Dolmovich argues." (Examiner's Answer at 10.) He adds, "the selection of any of these known equivalents to provide a conductive voltage dependent condition i.e. breakdown, breakover, etc. would be within the level of ordinary skill in the art." (Id. at 5.) We agree with the appellant.

Claims 1, 5-8, 10, and 14 each specifies in pertinent part the following limitations:

a breakover diode connected in a forwardly biased manner between the input of the first SCR and the trigger input of the first SCR, the at least one breakover diode being responsive to a predetermined value of a voltage differential (V) between the two terminals of the passive network for switching the first SCR from the high impedance path to the low impedance path to controllably discharge the capacitive energy storage device to the igniter plug.

Similarly, claim 11 specifies in pertinent part the following limitations:

a breakover diode responsive to the voltage differential (V) between the input and output terminals for switching the path between the two terminals provided by the solid-state switch from a high impedance value to a low impedance value, thereby controllably discharging the energy from the capacitive energy storage device to the igniter plug by way of the output circuitry.

Also similarly, claim 12 specifies in pertinent part the following limitations:

a breakover diode (BOD) responsive to the voltage differential (V) between the input and output terminals for effecting the switching of the path between the two terminals provided by the solid-state switch from a high impedance value to a low impedance value, thereby controllably discharging the energy stored in the capacitive energy storage device to the igniter plug by way of the output circuitry, where the BOD includes an anode connected to the input terminal and a cathode connected to a trigger input of the solid-state switch.

Also similarly, claim 13 specifies in pertinent part the following limitations:

a breakover diode responsive to a predetermined value of a voltage differential (V) between the two terminals for effecting the switching of the path between the two terminals provided by the solid-state switch from a high impedance value to a low impedance value, thereby controllably discharging



the capacitive energy storage device into a spark gap of the igniter plug by way of the output circuitry.

In summary, the limitations recite employing a breakover diode responsive to a predetermined voltage differential between two terminals of a passive network to switch a path between the terminals from a high impedance value to a low impedance value to controllably discharge a capacitor into an igniter plug.

The examiner fails to show a teaching or suggestion of these limitations in the prior art. The examiner admits, "AAPA and Horosawa [sic] also lacks [sic] the use of a break-over diode for the triggering means of the SCR." (Examiner's Answer at 6.) He further admits, "the Zener and the break-over diode are not identical, i.e. functional equivalent [sic]." (Id. at 10.) Nonetheless, the examiner alleges that the two elements "are art recognized equivalent [sic]." (Id.) He offers U.S. Patent No. 3,061,755 (Spira) as evidence of the art recognized equivalence. Specifically, the examiner notes, "Spira clearly shows the use of BOD [i.e., a breakover diode] in the same or the similar circuit where a Zener is used." (Id. at 11.)

Spira teaches a "combination of a switching means, a rectifier means, and a controllably conductive means which can control the flow of electrical current therethrough in a selective manner." Col. 2, ll. 19-23. The combination is used "in a system for selectively dimming [sic] the lumen output of an electric lamp." Col. 1, ll. 16-17. The reference specifically teaches employing a four-layer type diode, i.e., a breakover diode, as the controllably conductive element of the combination. Col. 6, ll. 38-42. Spira also specifically discloses, "the controllable conductive element could be the type device known as the Zener diode." Id. at ll. 42-44.

At best, the reference evidences that breakover diodes and Zener diodes were recognized as equivalents in the art of lamp dimming. The appellant's invention, however, "relates to ignition system ...." (Spec. at 1.) Spira does not evidence that breakover diodes and Zener diodes were recognized as equivalents in the art of ignition systems. In fact, the examiner has not offered any evidence of the equivalence of

the elements in the art of ignition systems. Neither Roberts nor Wolf remedies this deficiency.

For the foregoing reasons, we are not persuaded that the prior art would have suggested employing a breakover diode responsive to a predetermined voltage differential between two terminals of a passive network to switch a path between the terminals from a high impedance value to a low impedance value to controllably discharge a capacitor into an igniter plug. The examiner has not established a prima facie case of obviousness. Therefore, we reverse the rejection of claims 1, 5-8, and 9-14 under 35 U.S.C. § 103.

CONCLUSION

To summarize, the examiner's rejection of claims 1, 5-8,  
and 9-14 under 35 U.S.C. § 103 is reversed.

REVERSED

ERROL A. KRASS	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
LEE E. BARRETT	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
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LANCE LEONARD BARRY	)	
Administrative Patent Judge	)	

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